

## REMARKS

By this amendment, Applicants have corrected a typographical error at page 12, line 12 and have added new claim 27 to define a further aspect of the present invention. Claim 27 is supported by, e.g., Figures 1 and 2 and the description at page 12, lines 10-13 and page 14, lines 16-18 of Applicants' specification.

Claims 1-4, 7-9, 20, 21 and 24-26 stand rejected under 35 U.S.C. 102(b) as allegedly being anticipated by U.S. Patent No. 4,322,222 to Sass. Claims 6 and 23 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Sass. Applicants traverse these rejections and request reconsideration thereof.

The presently claimed invention is directed to a facility for producing synthesis gas from a solid feedstock including organic matter, the facility including means for circulating a heat-carrying solid providing at least some of the heat necessary for such production, a zone Z1 including pyrolysis and gasification means, a zone Z2 including separation means, a line for supplying gaseous and solid effluents from zone Z1 to zone Z2, a zone Z3 including gasification means, a zone Z4 including separation means, and a zone Z5 including combustion means.

According to the present invention:

- the zone Z1 has means for pyrolysis and gasification of the feedstock in a transported fluidized bed,
- the zone Z2 has means for at least partial separation of the effluents from zone Z1 into an essentially gaseous phase and into an essentially solid phase,
- the zone Z3 is supplied at least in part with the essentially solid phase and includes dense fluidized bed gasification means for gasification of the essentially solid phase, and

- the zone Z4 includes means for separating the effluents coming from zone Z3 into an essentially gaseous phase and into an essentially solid phase,
- the zone Z5 includes means for combusting the essentially solid phase coming from zone Z3 and means for transferring the heat-carrying solid coming from the combustion into zone Z1.

The Sass patent discloses, *inter alia*, that carbonaceous material is gasified in a first pyrolysis zone substantially in an absence of free oxygen by heating with a solid heating media. The carbonaceous material is conducted through the first pyrolysis zone in turbulent flow to provide for the rapid transfer of heat to effect the gasification. Gaseous products are recovered while char products are introduced into a second pyrolysis zone for additional gasification. The second pyrolysis zone is maintained substantially free of free oxygen. Gasification in the second pyrolysis zone is effected by the transfer of heat from a heating media to the char products produced in the first pyrolysis zone. Gaseous products from the second pyrolysis zone are recovered. The char products from the second pyrolysis zone can be heated to a temperature sufficient for use as a solid heating media.

The Examiner equates the first stage pyrolysis reactor 22 of Sass to the zone Z1 of the present invention, the separator 27 of Sass to the zone Z2 of the present invention, the second pyrolysis reactor 38 of Sass to the zone Z3 of the present invention, the separator 50 of Sass to the zone Z4 of the present invention and the char furnace 68 of Sass to the zone Z5 of the present invention.

However, the Sass patent does not disclose a number of claimed features of the facility of the present invention. For example, according to the presently claimed invention, the zone Z1 has means for pyrolysis and gasification of the feedstock in a

transported fluidized bed. The phrase “transported fluidized bed” is defined at page 7, lines 21-25 of Applicants’ specification as meaning “that the rise rate of the gas is, measured by the ratio between the flowrate of the carrier gas introduced and the cross section of the reactor, is greater than the terminal sink rate in the reactor of the fraction of particles with the largest diameter.” The Sass patent does not disclose that the first stage pyrolysis reactor 22 comprises a transported fluidized bed.

In addition, according to the presently claimed invention, the zone Z3 includes dense fluidized bed gasification means for gasification of the essentially solid phase. As defined at page 11, lines 2-6 of Applicants’ specification, “dense fluidized bed” means “a bed of dense particles for which the superficial velocity of the gaseous in the reactor is less than the terminal drop velocity in the reactor of the fraction of particles with the largest diameter but greater than the superficial velocity of the gas needed to achieve sufficient fluidization of the bed.” The Sass patent does not disclose that the second stage pyrolysis reactor 38 includes dense fluidized bed gasification means.

Moreover, at least with respect to new dependent claim 27, the Sass patent does not disclose a line directly connecting the second stage pyrolysis reactor 38 to the char furnace 68. Therefore, the Sass patent does not disclose a line directly connecting zone Z3 to zone Z5 for transferring the essentially the solid phase coming from zone Z3 to zone Z5. Rather, the char furnace 68 receives char from separator 50 (which the Examiner equates to zone Z4) by the line 62; the furnace 68 does not receive char directly from the second stage pyrolysis reactor 38.

For the foregoing reasons, the presently claimed invention is patentable over Sass.

Claims 5 and 22 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Sass in view of U.S. Patent No. 4,347,064 to Reh et al. Applicants traverse this rejection and request reconsideration thereof.

The Examiner has cited the Reh et al. patent as allegedly teaching that gaseous effluent from a pyrolysis reactor is sent through two cyclone separators in order to provide a more thorough separation of the solid and the gaseous. However, clearly nothing in Reh et al. would have remedied the basis deficiencies noted above with respect to Sass. Accordingly, claims 5 and 22 are patentable over the proposed combination of patents, at least for the reasons noted above.

In view of the foregoing remarks, favorable reconsideration and allowance of all the claims now in the application are requested.

To the extent necessary, applicants petition for an extension of time under 37 CFR 1.136. Please charge any shortage in the fees due in connection with the filing of this paper, including extension of time fees, to the deposit account of Antonelli, Terry, Stout & Kraus, LLP, Deposit Account No. 01-2135 (Case: 612.43484X00), and please credit any excess fees to such deposit account.

Respectfully submitted,

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